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EXAMINER	
MELLON, DAVID C	
ART UNIT	PAPER NUMBER
1797	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/532,560	LESCOCHE, PHILIPPE	
	Examiner	Art Unit	
	DAVID C. MELLON	1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *4/30/2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4 and 6-17* is/are pending in the application.

4a) Of the above claim(s) *10-17* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4 and 6-9* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. Claims 1-4 and 6-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Garcera et al. (USP 6,375,014), in view of Childs et al. (USP 7,247,370), initial publication 1/30/2003 as WO 03/008078 with effective filing date 7/20/2001 from US Provisional 60/306412, and further in view of Grangeon et al. (USP 6,499,606) with French foreign priority date of 8/4/1999.

Regarding claim 1, Garcera et al. discloses a membrane with an increasing mean porosity in the direction of flow (Abstract) in figure 1 comprising:

- A porous support (1), delimiting at least one flow channel for fluid to be treated (2) flowing in a given direction between an inlet and an outlet (see in figure 1 arrows indicating direction of flow)

- Having variable partial-pore filling (C5/L50-65 – impregnation) on a portion of the support of a constant thickness creating a mean porosity gradient in the direction of the flow of fluid (Abstract, see section 3 in figure 1, "region impregnated", C4/L35-41), the minimum porosity being located at the inlet and the maximum porosity at the outlet (C4/L23-35 – see also figure 1, decreasing amount of impregnation from inlet to outlet).

Garcera et al. does not explicitly disclose that the channel is coated with at least one separator layer or that the partial-pore filling is such that the partial-pore filling extends from the inner surface of the porous support.

Childs et al. discloses asymmetric membranes composed of a microporous substrate whose pores contain a cross-linked gel being greater at or adjacent to a surface of the membrane (Abstract) in figure 5, specifically the instance pictured on the left in figure 5. Childs et al. discloses that the pore filling gel can be placed in a configuration such that the porous support filled with the gel asymmetrically is facing the fluid flowing rather than being on the outside away from the flow of fluid (see figure 5 on the left and C8/L10-40).

Garcera et al. and Childs et al. are combinable because they are concerned with the same field of endeavor, namely that of pore filling of porous membrane supports.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the partial-pore filled membrane structure of Garcera et al. by making it such that the partial-pore filling occurs from the inside of the membrane to the

outside as taught by Childs et al. for the purpose of decreasing the amount of fouling experienced by the membrane during operation.

Grangeon et al. discloses a cross-flow filter membrane (title) comprising a porous support and a separator layer (abstract) in figures 1-3. The membrane has an inorganic porous support (2) with a separator layer (4).

Garcera et al. and Grangeon et al. are combinable because they are concerned with the same field of endeavor, namely that of membranes using porous supports.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the porous support membrane of Garcera et al. to include the use of a separator layer as taught by Grangeon et al. for the purpose of improving the separation achieved by including a pre-filter component to the membrane.

Regarding claim 2, modified Garcera et al. discloses all of the claim limitations as set forth above. Furthermore, modified Garcera et al. inherently discloses a flux density gradient per unit of pressure with the minimum flux at the inlet and the maximum at the outlet since the porosity is lowest at the inlet and highest at the outlet.

Regarding claim 3, modified Garcera et al. discloses all of the claim limitations as set forth above. Garcera et al. as modified by Childs et al. further discloses that the mean porosity of the support increases inside the support in a transverse direction to the direction of the flow of fluid between the inside surface and the outer surface (see figure 1 of Garcera et al. and further figure 5 of Childs et al.).

Regarding claim 4, modified Garcera et al. discloses all of the claim limitations as set forth above. Modified Garcera et al. further discloses that the variable partial-pore

filling is made over a depth from the inner surface which decreases in the direction of flow (see figure 1 in Garcera et al. along with figure 5 of Childs et al., combined as such to create the partial-pore filling from the inside to the outside and a decreasing penetration depth in the direction of the fluid flow).

Regarding claim 6, modified Garcera et al. discloses all of the claim limitations as set forth above. Garcera et al further discloses that the partial pore-filling is obtained by penetration of the support with inorganic particles whose mean diameter is smaller than the mean pore diameter of the support (C6/L15-20 - 0.1-4 micron particles, C8/L10-21 - 12 micrometer initial pore diameter, C6/L5-10 - "inorganic" impregnation material).

Regarding claim 7, modified Garcera et al. discloses all of the claim limitations as set forth above. Garcera et al. further discloses that the penetration of inorganic particles is followed by sintering (C5/L64-C6/L5).

Regarding claim 8, modified Garcera et al. discloses all of the claim limitations as set forth above. Garcera et al. as modified by Childs et al. further discloses a mean porosity which increases in a substantially continuous manner in the direction of the flow of fluid to be treated to obtain a substantially constant permeate flow along the flow channel (see figure 1 of garcera et al., C5/L30--52).

Regarding claim 9, modified Garcera et al. discloses all of the claim limitations as set forth above. Garcera et al. does not explicitly disclose the use of mean porosity plateaus in the direction of flow, with the length of the plateaus being substantially identical.

Grangeon et al. in figure 3 discloses a thickness gradient in the separator layer that diminishes in steps P in the flow direction of the fluid to be treated (C4/L35-45) which are of substantially the same length.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the mean porosity gradient of Garcera et al. such that it is stepwise using plateaus as taught by the separator layer of Grangeon et al. for the purpose of having areas of known mean porosity at constant levels rather than potentially variable continuous zones.

4. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Garcera et al. (USP 6,375,014), in view of Childs et al. (USP 7,247,370), initial publication 1/30/2003 as WO 03/008078 with effective filing date 7/20/2001 from US Provisional 60/306412, and further in view of Pirbazari et al. (USP 5,505,841).

Regarding claim 1, Garcera et al. discloses a membrane with an increasing mean porosity in the direction of flow (Abstract) in figure 1 comprising:

- A porous support (1), delimiting at least one flow channel for fluid to be treated (2) flowing in a given direction between an inlet and an outlet (see in figure 1 arrows indicating direction of flow)
- Having variable partial-pore filling (C5/L50-65 – impregnation) on a portion of the support of a constant thickness creating a mean porosity gradient in the direction of the flow of fluid (Abstract, see section 3 in figure 1, “region impregnated”, C4/L35-41), the minimum porosity being located at the inlet

and the maximum porosity at the outlet (C4/L23-35 – see also figure 1, decreasing amount of impregnation from inlet to outlet).

Garcera et al. does not explicitly disclose that the channel is coated with at least one separator layer or that the partial-pore filling is such that the partial-pore filling extends from the inner surface of the porous support.

Childs et al. discloses asymmetric membranes composed of a microporous substrate whose pores contain a cross-linked gel being greater at or adjacent to a surface of the membrane (Abstract) in figure 5, specifically the instance pictured on the left in figure 5. Childs et al. discloses that the pore filling gel can be placed in a configuration such that the porous support filled with the gel asymmetrically is facing the fluid flowing rather than being on the outside away from the flow of fluid (see figure 5 on the left and C8/L10-40).

Garcera et al. and Childs et al. are combinable because they are concerned with the same field of endeavor, namely that of pore filling of porous membrane supports.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the partial-pore filled membrane structure of Garcera et al. by making it such that the partial-pore filling occurs from the inside of the membrane to the outside as taught by Childs et al. for the purpose of decreasing the amount of fouling experienced by the membrane during operation.

Pirbazari et al. discloses a microfiltration membrane (C2/L45-55) in figure 1 comprising a microfilter membrane on a membrane support.

Garcera et al. and Pirbazari et al. are combinable because they are concerned with the same field of endeavor, namely that of membranes using porous supports.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the porous support membrane of Garcera et al. to include the use of a microfiltration membrane on a membrane support as taught by Pirbazari et al. for the purpose of improving the separation achieved by including a pre-filter component to the membrane.

Double Patenting

5. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

6. Claims 1, 3-4, and 6-9 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 5-6, 9-14 of copending Application No. 11/587048. Although the conflicting claims are not identical, they are not patentably distinct from each other because the both are drawn to a

porosity gradient porous support membrane with a separation layer in which the porosity gradient is formed by partial pore filling or clogging. Further, the mean porosity is disclosed as decreasing both longitudinally and transversely with fluid flow and the membrane is disclosed as having a central channel or channels.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Response to Arguments

7. Applicant's arguments filed 4/30/2009 have been fully considered but they are not persuasive.

- Applicant alleges that the Garcera reference and the Childs reference are non-combinable due to fundamental differences. This being that Garcera deals with thin film membranes and Child's explicitly deals with pore filled membranes.

The Examiner respectfully disagrees. The references of Garcera and Childs are clearly combinable because they are both related to pore filled/clogged membranes. For instance, Applicant is pointed to the following passage of Garcera at C5/L1-21:

In one embodiment of the invention, the device is a macroporous block having one or several channels optionally covered with a filtering layer, and impregnated, starting from the outer surface at the permeate side, to a decreasing extent in the direction of its length, at least over a part of its thickness, with an inorganic or organic material so as to thereby reduce the porosity of the impregnated region compared to that of the non-impregnated region. The ratio of mean porosity at the outlet end of the macroporous block to the mean porosity at the inlet end of the macroporous block is comprised between 1.1 and 4. This variation in porosity makes it possible to set up a variation in transmembrane pressure which is substantially equivalent to longitudinal pressure drop caused by the liquid to be treated, circulating in the channel(s). Indeed, while passing through the macroporous support, the permeate meets with additional resistance to flow in the impregnated region, which has a lower porosity than that of the non-impregnated region. This constraint increases as thickness of the impregnated region increases, and thus needs to be larger at the entry for the fluid to be treated.

Here, it is clearly discloses that the macroporous block is impregnated. Accordingly, this impregnation cannot represent a thin film membrane. Clearly, an impregnated macroporous structure is not analogous or remotely similar to a thin-film composite membrane structure. Additionally, thin film membranes are commonly formed by creating a separate layer which adheres to the surface of the macroporous support, and not impregnated in. Furthermore, Garcera makes no reference to "thin film" or similar terms nor does Garcera disclose any such layer being formed on the surface of the macroporous membrane. Rather Garcera clearly establishes impregnation of the macroporous support with pore filling material. Furthermore, the Childs reference was taught in for the purpose of disclosing having pore filling on the fluid to be treated side

rather than the permeate side. Childs was not taught in for the purpose of disclosing chemistry and specific pore filling materials. Accordingly, one having ordinary skill in the art at the time of the invention would have known to consider the reference of Childs at the time of the invention for the purpose of determination of what the optimal pore filling direction and configuration is.

- Applicant alleges that Childs and Garcera are not combinable because they use different pore filling materials/permeability modifying materials.

The Examiner respectfully disagrees. Garcera while not disclosing the use of organic gel materials does contemplate and envisage the possibility of organic permeability modification via polymers (see Garcera C6/L15-30): "the impregnation material is ceramic or polymer material.

- Applicant alleges that Garcera and Childs are not combinable because they are concerned with tubular and flat sheet membranes respectively.

The Examiner respectfully disagrees and contends that the references are in fact combinable. While the two references are in regards to tubular and flat sheet membranes, the membranes are still analogous. A tubular membrane is merely a flat sheet membrane that is rolled into a tube. Accordingly, one having ordinary skill in the art at the time of the invention would have considered flat sheet techniques and configurations when configuring a tubular membrane.

- Applicant alleges that in figure 1 of Childs, the Childs membrane is the pore filled one and the Garcera membrane is the thin film one.

The Examiner respectfully disagrees. Applicant has provided no evidence establishing that the membrane of Garcera is thin film. Furthermore, clearly Childs discloses no reference to Garcera nor does Child state that the Garcera membrane is thin film. Additionally, Applicant has not established any evidence which proves that Garcera is any type of membrane other than a pore filled membrane unit.

- Applicant alleges hindsight reasoning in the combination of Childs and Garcera.

In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

- Applicants argue that there is no teaching to support adding a separator layer and that Childs teaches away.

The Examiner respectfully disagrees. As established above, Childs does not teach away and is in fact combinable. Furthermore, Garcera at C5/L1-5 discloses and envisages the possibility of an “optional filtering layer” covering the macroporous support. Accordingly, one having ordinary skill in the art would have known to consider a filter/separator layer in addition to the permeability modified macroporous support of

Garcera for the purpose of improving the filtration and preventing damage to the macroporous support. Furthermore, the Examiner notes that this filtering layer is clearly not the permeability modified porous support and accordingly is in addition to the macroporous partially pore filled support. Furthermore, Applicant's separation layer is clearly anticipatable by a filter layer or in fact by a thin film composite upon a modified macroporous support with permeability modifications.

- Applicant alleges that the restriction requirement should be withdrawn in view of the clear allowability of the apparatus claims.

The Examiner respectfully disagrees. As conveyed in this Office Action, there are no claims currently allowed. Therefore, the restriction requirement is maintained and remains final.

- Applicant alleges that Garcera does not explicitly discuss modification of the support for each channel but makes a single modification for all channels.

Applicants argument is not commensurate with the scope of Applicant's claims. Further, the Examiner respectfully disagrees. As Garcera modifies the macroporous membrane and Applicant's claims read on a modified macroporous membrane, Applicant has not patentably distinguished his claims from that of the prior art. Furthermore, Applicant is not claiming that there are multiple fluid channels or that all aspects of the fluid channel support are modified.

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies

(i.e., all of the macroporous support being modified for multiple channels) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Conclusion

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to DAVID C. MELLON whose telephone number is (571)270-7074. The examiner can normally be reached on Monday through Thursday 7:00am-4:30pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vickie Kim can be reached on (571) 272-0579. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Tony G Soohoo/
Primary Examiner, Art Unit 1797

/D. C. M./
Examiner, Art Unit 1797